

GBT Systems Report on Project Coordination for September 2000
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NRAO and Lockheed-Martin completed the terms of modified final acceptance of the GBT on September 28. Any items that were considered potential acceptance issues have been identified in a punch list. NRAO has retained sufficient funds to ensure that Lockheed-Martin completes the items on the punch list. Starting October 2, NRAO will have control of the telescope. The GBT will be placed in the access position for the month of October so that NRAO can complete its outfitting chores. In the evening, Lockheed-Martin will continue with the alignment of the elevation bull gear. Any liability issues connected with their use of the telescope will be covered by their insurance. The one year warranty on the telescope will start on November 1.

The inspection of the azimuth wheel bearings was completed in late September. After the bearing retainer plates were removed and the grease cleaned from the bearings, the bearings were graded on a scale of 1 to 5. A grade of 1 indicated that the bearing was good, a 2 meant that discoloration was visible on the bearing, a 3 indicated that slight indentations could be felt on the bearing, a 4 was given to bearings with obvious pitting, and a 5 was assigned to bearings in poor condition. A bearing was considered bad if it received a grade of 3 or higher. Using these criteria, 9 of the 32 bearings failed the inspection (there are 2 bearings in each of 16 azimuth wheels). Lockheed-Martin and NRAO graded the bearings independently, and the grading results of the two parties generally agreed. Lockheed-Martin will submit a plan for bearing replacement in the next few weeks. After the bearings were inspected, the retainer plates were reinstalled and the entire bearing cavity was filled with a new type of grease.

Tests of the elevation encoder by Tim Weadon showed that apparent errors in encoder readings were caused by thermal expansion of the encoder mount. At sunrise with the encoder mount exposed to sunlight, the encoder reading changed by 20 arcseconds although the telescope elevation was fixed. This apparent error exceeded the 14 arcsecond pointing error budget that was specified for the antenna. After shading the encoder, the apparent error was reduced to a 7 arcsecond variation that was anti-correlated with ambient temperature. The fact that there was no time delay between the encoder reading and temperature suggested that what was causing the error had a small thermal mass (i.e. the encoder mount). Lockheed-Martin has agreed to build a more massive mount for the encoder and to enclose it with a small shelter. Work is underway to determine why the azimuth encoder readings also show a dependence upon ambient temperature.

Progress in outfitting the active surface system has been very good. All control panels have been installed in the Actuator Control Room (ACR), and all 2209 actuator cables have been terminated at the panels. All 61 of the wet connectors on the actuator cables have been replaced. Lockheed-Martin has delivered 70 of the 80 replacement connectors for NRAO's spare stock.

Motion of the elevation gear segments was discovered during servo testing. The elevation bullgear is now being realigned. To avoid motion of the segments in the future, the keys between segments are being trimmed, and the segments are being pressed closer together. The segments will be held in place by stops welded at either end of the bullgear. It is possible that a metal grout may need to be installed along the gear segments to secure them in place.

Grease was installed on the azimuth track as a protective coating during construction. The grease will be removed prior to telescope operation to ensure better wheel traction and to provide better electrical contact for the telescope's lightning protection system. It is thought that rust will not accumulate on the track because of the continuous operation of the telescope. Most wheel and track antennas (e.g. VLBA and Bonn) run on the bare metal of the azimuth track. NRAO may apply some type of protective coating at the edges of the track where there is no wear by the azimuth wheels.

The servo test procedure calls for a "hard stop" of the antenna at an elevation of 5 degrees. Lockheed-Martin has been reluctant to conduct this test because of potential damage to the structure. Hard stops have already occurred at other elevation angles and are certain to occur again upon the failure of commercial power. Recognizing that hard stops are not good for the long term operation of the antenna, NRAO and Lockheed-Martin have agreed to implement a "soft stop" for the antenna. The details of how this will be done are being investigated.

Initial tests of the turret drive motor in the receiver room indicated that the current drawn by the motor exceeded its rated value. Additional tests showed this was not the case. The current was essentially the same when the turret guide rollers were tight or loose, suggesting that most of the friction in the turret occurs at the turret weather/RFI seal.

Requests for quotation on the installation of a fence around the GBT site were submitted on September 7. Bids are due October 16, and the installation of the fence should begin in mid-November. The fence should be installed by the end of the year.

The installation of surface retroreflectors is complete with the exception of 50 retroreflectors at the antenna vertex.

Lockheed-Martin delivered three sets of GBT operation and maintenance manuals. Data for the final alignment of the GBT subreflector was also submitted for NRAO's approval.